I Z A Institute of Labor Economics

Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

State-Based Conflict and Entrepreneurship: Empirical Evidence

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ABSTRACT

State-Based Conflict and Entrepreneurship: Empirical Evidence

This paper investigates the relationship between state-based conflict and entrepreneurship. From a survey of the existing literature, we formulate two hypotheses: (1) state-based conflict has a negative association with productive and opportunity-motivated forms of entrepreneurship, and (2) a positive association with unproductive and necessity-motivated forms of entrepreneurship. We test these hypotheses by drawing on several state-based conflict and entrepreneurship measures, using appropriate estimators, and employing robustness checks. The evidence supports our hypotheses. Necessity-motivated start-up entrepreneurship is, on average, almost three times higher in countries in conflict than in countries not in conflict. Development level matters. In countries with less unemployment, more finance, and higher levels of physical, human capital and GDP, entrepreneurship is more resilient, and the ratio of female-to-male entrepreneurs in opportunity-motivated entrepreneurship higher.

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1 Introduction

By 2020, even before the Russian invasion of Ukraine, which shattered Europe's post-war peace, there were already 56 active state-based[1] conflicts[2] raging in the world, the most since World War II. Since the end of the Cold War, these conflicts have claimed more than 1,5 million direct casualties. The broader costs on human lives and livelihoods are horrendous, with the legacy of conflict including "substantial loss of livelihoods, employment and incomes, debilitated infrastructure, collapse of state institutions and the rule of law, continuing insecurity and fractured social networks" (UNDP, 2008, p.xvii).

The channels of the economic, political, and humanitarian impacts of such state-based conflicts have been extensively studied - see for example de Groot et al. (2022), Blattman and Miguel (2010), Bove et al. (2017), Bozzoli et al. (2010), Collier (1999) and Verwimp et al. (2019). A relatively neglected but potentially important channel is entrepreneurship (Brück et al., 2013; Desai et al., 2021). Conflict is likely to reduce opportunities and institutions for entrepreneurship, which in turn has adverse consequences for growth, job creation and development. The neglect of studying the relationship between entrepreneurship and state-based violence is an apparent weakness given the prevalence of state-based conflict throughout the world - and throughout history.[3]

The neglect of studying the relationship between entrepreneurship and state-based violence is also regrettable in light of high expectations regularly assigned to entrepreneurship as catalyst of development in the poorest countries. Many of these countries have been devastated by armed conflict, and many others are experiencing various degrees of political instability and low-intensity conflict. They have been labelled as fragile and conflict affected states (Naudé et al., 2011; IMF, 2022). Understanding how state-based conflict impacts on entrepreneurship may be a necessary (though not sufficient) condition for supporting entrepreneurs in fragile states, preparing entrepreneurs for working in insecure conditions when conflict seems eminent, and for designing appropriate post-conflict reconstruction strategies to generate a peace-dividend. These are all requirements for improving the resilience and impact of entrepreneurship through the conflict cycle (Addison and Brück, 2009; Amorós et al., 2017; Naudé et al., 2013; Naudé, 2009).

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[1] A state-based conflict is a "conflict between two parties, where at least one is the government of a state" (UCDP/PRIO).

[2] As per the UCDP/PRIO definition, a conflict is counted for a particular year if it resulted in at least 25 direct civilian or military deaths - excluding deaths from disease or famine.

[3] For an insightful overview of the history of (state-based) armed conflict and its relationship to economic factors, see Brauer and van Tuyll (2008).

Consequently, the purpose of this paper is to add to the understanding of the impact of state-based conflict on entrepreneurship. A critical cost of conflict occurs when a state starts turning against its citizens and businesses. We therefore focus our analysis on the consequences of state-based conflict, where such predation may occur, recognising that political violence between various non-state actors may have significant albeit structurally different impacts on entrepreneurship. We study this context by providing empirical estimates of the cross-country association between state-based armed conflict and entrepreneurship using several measures of state-based armed conflict and entrepreneurship. State-based armed conflict is measured by battle-related deaths, which reflects not only the existence of violent conflict, but also its intensity, and by military expenditure as a share of GDP, which reflects the militarization of society and the opportunity costs of state-based conflict. Entrepreneurship is measured using dynamic start-up measures such as early-stage rates and static business ownership / self-employment rates, as well as by motivation, for instance whether someone is in entrepreneurship due to necessity or pursuing an opportunity.

Data on these measures of state-based violent conflict and entrepreneurship are respectively sourced from UCDP/PRIO, the Global Entrepreneurship Monitor (GEM) and the International Labour Organization (ILO). Eighteen years (2001-2018) and 91 countries are covered - the coverage determined by the availability of data in the GEM. We analyze the combined dataset using various estimators - such as fractional logit and system dynamic panel data estimators – and thereby account for the fractual nature of our dependent variables, endogeneity, and to exploit the (unbalanced) panel nature of our data.

The analysis suggests two key findings. First, we find that both descriptive and regression statistics support our hypotheses. Necessity-motivated start-up entrepreneurship is on average 193% (almost three times) higher in countries in conflict than in countries not in conflict. And countries suffering state-based armed violence had more survivalist / non-productive entrepreneurship, were more militarized, and were substantially poorer. Second, development level matters for the impact of state-based conflict on entrepreneurship, including the ratio of female-to-male entrepreneurs. In countries with less unemployment, more finance, higher levels of physical and human capital, and GDP, productive entrepreneurship is more resilient - even though it cannot completely escape being negatively affected.

These results contribute to the literature in that they are, to the best of our knowledge, the first comprehensive set of empirical estimates on the cross-country association between state-based conflict and entrepreneurship. It complements the results set out in the 2013 special issue on violent conflict and entrepreneurship (see Brück et al. (2013) which, due

to lack of data availability, only focused on the micro-level impacts of violent conflict on entrepreneurship, and not the cross-country, aggregate impacts.

The paper is structured as follows. In section 2, we engage with the literature on state-based conflict and entrepreneurship, drawing from these various hypotheses on the impact of state-based conflict on entrepreneurship. Section 3 explains our methodology - including data, estimators, and our estimation strategy. Section 4 sets out our empirical results - first descriptive, then regression results, and finally, several robustness checks. Section 5 concludes.

2   Relevant Literature

We start with the definitions of entrepreneurship and state-based armed conflict and review the current state of the literature on the impacts of the latter on the former, and vice versa.

2.1   Defining and measuring entrepreneurship

Shane and Venkataraman (2000, p.218) defined the field of entrepreneurship as "the scholarly examination of how, by whom, and with what effects opportunities to create future goods and services are discovered, evaluated, and exploited." The establishment, ownership and growth of a business firm are distinctive features in this definition. Novel entrepreneurship can be said to be the case when new goods, services and markets are created, as opposed to routine entrepreneurship, where businesses compete in essentially established markets Acs et al. (2016).

Entrepreneurship is commonly measured statically, as self-employment[4] (published for e.g., by the International Labour Organization) or established business owner rates[5] (published

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[4]The International Labour Organisation (ILO) publishes cross-country data on around 190 countries including the rate of self-employment as a proportion of the labour force. The ILO also makes a distinction between employers in self-employment, and own-account workers in self-employment. The former more accurately corresponds to the notion of entrepreneurship as job-creating. See ILOStat: `https://ilostat.ilo.org`

[5]Drawn from the GEM Adult Survey, the World Bank reports cross-country business ownership measures, which are defined as the "percentage of 18-64 population who are currently an owner-manager of an established business, i.e., owning and managing a running business that has paid salaries, wages, or any other payments to the owners for more than 42 months" - see `https://tcdata360.worldbank.org`.

e.g., by the GEM); or dynamically, as new venture creation[6] (for e.g., by GEM) or new business density rate[7] (e.g., by the World Bank). Figures 1 and 2 contain, as illustration, snapshots of selected static and dynamic entrepreneurship rates worldwide, according to the most recent data available at the time of writing.

Figure 1: Static Entrepreneurship Illustrated: Established Business Ownership Rates, 2020
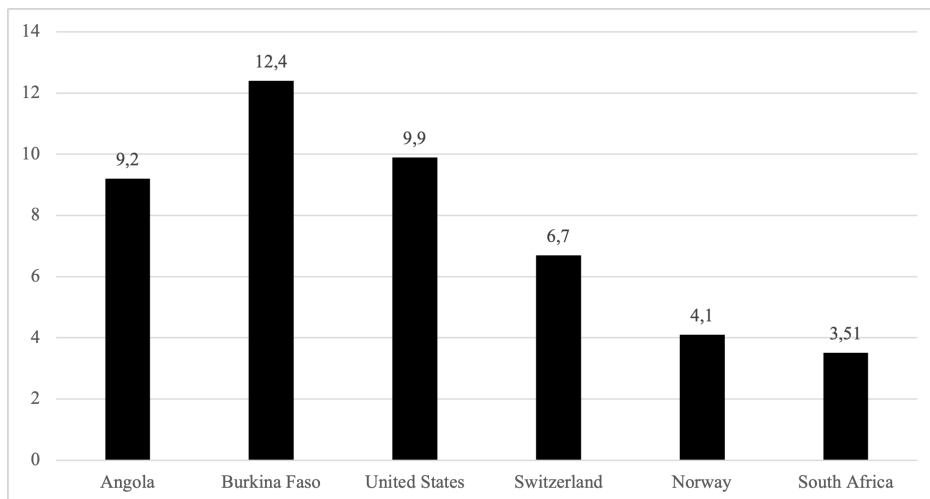
Source: Authors, based on GEM data from World Bank: `https://tcdata360.worldbank.org`.

Figure 1 shows that the business ownership rate, a measure of static entrepreneurship, exhibits notable cross-country variation. Generally, but not always, rates of business ownership tend to be higher in developing countries than in more affluent countries - thus, in Figure 1, the business ownership rate was twice as high in 2020 in Angola than in Norway. There are anomalies: the USA has a relatively high business ownership rate for an advanced economy, and South Africa has a surprisingly low business ownership rate for a developing, Sub-Saharan African economy.

Figure 2 shows dynamic rates of entrepreneurship - start-up rates - as measured by the business density measure of the World Bank. It illustrates another rather salient feature of start-up rates, namely that they tend to be depressed in poorer countries compared to start-ups in upper-middle-income and high-income countries.

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[6]The GEM publishes cross-country early-stage entrepreneurship activity as start-up rates, which they label total entrepreneurial activity (TEA) rates. These are defined as the "percentage of 18-64 population who are either a nascent entrepreneur or owner-manager of a new business" - see `https://www.gemconsortium.org/wiki/1154`.

[7]The World Bank publishes cross-country data on the new business density rate in several countries, which they define as "the number of newly registered corporations per 1,000 working-age people (those ages 15–64). The units of measurement are private, formal sector companies with limited liability" - see `https://www.worldbank.org/en/programs/entrepreneurship`.

Figure 2: Dynamic Entrepreneurship: Business Density Rates, Average 2010-2020
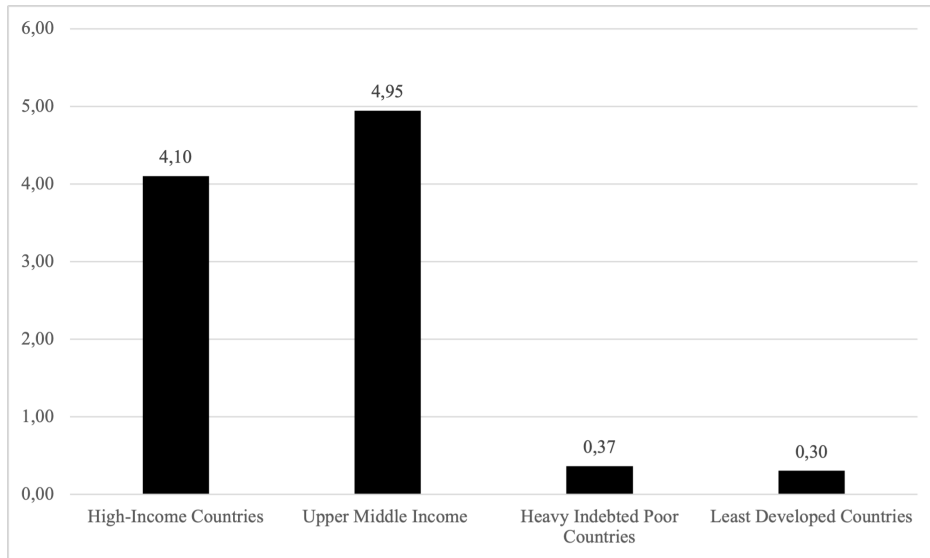
Note that in the above, although entrepreneurship was defined with respect to business creation and ownership, we did not allude to firm size. Most firms in the world are micro, small, and medium enterprises (MSMEs), defined as firms with fewer than 250 employees (Ardic et al., 2011). They, moreover, tend to be even more predominant in developing countries. MSMEs are widely seen as "the most conducive environment for entrepreneurship and innovation" (Sahut and Peris-Ortiz, 2014, p.663).

2.2 Determinants of entrepreneurship rates

Given the definition and measures of entrepreneurship set down and the heterogeneity in these already evident in the data presented in Figures 1 and 2, the question is, what determines the cross-country variance in entrepreneurship rates?

The consensus in this literature is that the variance in cross-country entrepreneurship rates is determined by the following:

- The institutional environment - proxied by GDP per capita (Naudé, 2011; Torrini, 2005; Wennekers et al., 2010).

- The size of the market - proxied by population size and trade openness (Coulibaly et al., 2018).

- Skills, innovativeness, and productivity -proxied by human capital, total factor productivity (Baptista et al., 2007; Murphy et al., 1991).

- The opportunity cost of entrepreneurship - proxied by unemployment (Fonseca et al., 2001).

- The availability of finance - proxied by domestic credit to the private sector by banks (De Meza and Webb, 1999; Banerjee and Newman, 1993).

- Startup costs and regulations - measured by the cost of business start-up procedures (Ciccone and Matsuyama, 1996; Djankov et al., 2002; Klapper et al., 2006).

- Physical investment / uncertainty - proxied by the capital stock (Kihlstrom and Laffont, 1979; Sandri, 2014).

The relationship between the institutional environment (proxied by GDP per capita) and entrepreneurship rates is non-linear. Specifically, the literature has found a U-shaped relationship between development and entrepreneurship (Wennekers et al., 2010).

In section 3 of this paper, we will use these standard entrepreneurship determinants as control variables.

2.3   Defining and measuring state-based conflict

Having defined and measured entrepreneurship, we can do the same for conflict. In this paper, we are not concerned with all forms of conflict but only with violent armed conflict. Such conflict that goes beyond the conflict associated with crime[8] is "instrumental and purposeful - often related to a contest for political power under the form of a civil war with the state as one of the contending parties" (Brück et al., 2013, p.3). More formally, the Uppsala Conflict Data Program (UCDP) defines state-based violent conflict as "a contested incompatibility that concerns government and/or territory over which the use of armed force between two parties, of which at least one is the government of a state, has resulted in at least 25 battle-related deaths in one calendar year" (Pettersson et al., 2021). Battle-related deaths are thus a direct and immediate measure of state-based conflict. It reports conflict only when there has been a significant battle involving a state actor in a particular year.

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[8]Of course, as Brück et al. (2013, p.3) point out, "the distinction between crime and politically motivated violence is often difficult to distinguish in practice and may become blurred during the conflict. Indeed, protracted civil conflicts are accompanied by the rise and spread of organized crime."

Such conflicts can be further categorized into civil conflicts, which are between a state and a non-state actor; interstate conflict, which is between two states; and non-territorial conflict, which refers to a country being involved in a civil or interstate conflict that does not takes place on its territory (de Groot et al., 2022, p.260). Note that, because of our choice in this paper on state-based violence, we are not focusing on inter-ethnic violence where the state is not a direct participant (as in Muslim-Christian violence in Nigeria or Muslim-Hindu violence in India). This is not to downplay such kinds of violence, but is instead for two reasons: one, as indicated in the introduction, state-based conflicts have been rising and are currently at the highest number since the end of the World War 2 - see Figure 3; and two, because the nature and determinants of state-based and non-state based violent conflict are distinct. It is outside the scope of a single paper to address all kinds of violent conflict. Quantifying the impact of non-state conflict/ inter-ethnic conflict on entrepreneurship is left for a future study.

Figure 3: State-Based Conflicts Worldwide, 1946-2020
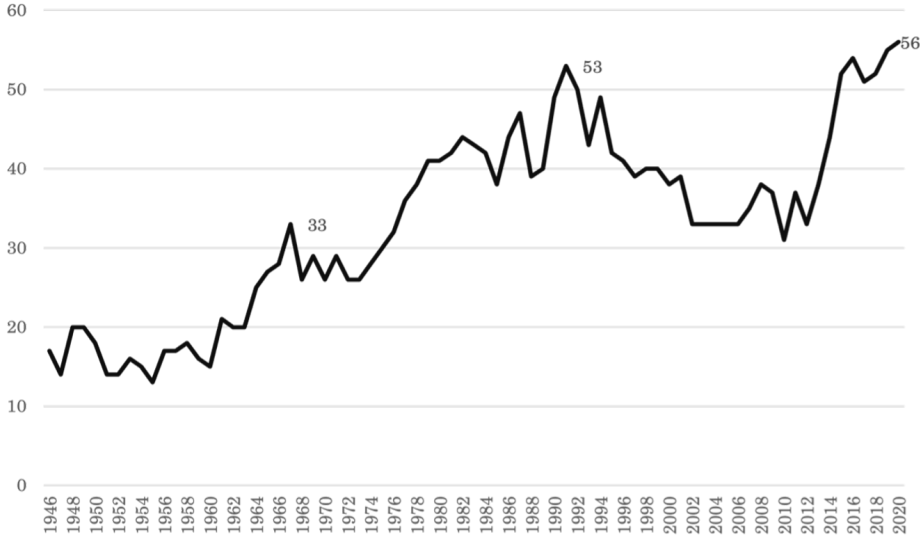
Source: Authors, based on UCDP / PRIO data.

2.4 The impact of state-based conflict on entrepreneurship

2.4.1 Impacts on entrepreneurial opportunities across business stages

Given the definitions presented in the previous section, it can be concluded that state-based armed conflict will affect entrepreneurship through the opportunities that entrepreneurs

perceive. Conflict alters how they discover, evaluate, and exploit opportunities. Given the centrality of opportunities, the Global Entrepreneurship Monitor (GEM) makes a distinction between opportunity-based entrepreneurship and necessity-based entrepreneurship (McMullen et al., 2008; Amorós et al., 2017). *A priori*, one may expect that state-based conflict would shrink the opportunity space, leading to relatively more necessity-based entrepreneurship.

As far as the impacts of state-based armed conflict on entrepreneurship are concerned, conceptually, these will affect entrepreneurship through all the stages of business creation and growth - from ideation to the start-up, growth, internationalization, disposal, or closing/ failure phases. It will also have different short and long-term impacts. The effects can be either positive or negative, although, as we will show in the following, over time the negative impact of conflict overshadows any positive impacts.

For example, for start-up (early-stage) entrepreneurship, the shrinking of the aggregate opportunity space, and the higher costs of starting up a new firm in a conflict-ridden environment, will tend to reduce start-up ventures. However, the shrinking of the opportunity space will also reduce wage employment opportunities, which would push people into self-employment and result in necessity-motivated entrepreneurship. But not all opportunity-driven entrepreneurship will dry up: in some sectors or regions there may be more opportunities - for instance to supply military and medical equipment, or to cater to spatial changes in demand due to internal displacement of persons. Entrepreneurs can also be tenacious, and some show remarkable resilience in the face of conflict(Brück et al., 2013).

Similarly, over the short-term, increased fiscal expenditure associated with a state-based conflict will create opportunities for some. However, over the longer term macro-economic instability and uncertainty eliminates more opportunities than any the conflict could have created (Bozzoli et al., 2010). State-based conflicts may have long-term adverse effects even if in some years there are no conflict. For instance, states that are, have been, or expect to engage in armed battles, will devote more resource towards militarization. This could be detrimental to economic development (and opportunity-driven entrepreneurship) by reducing the peace-dividend, and by raising uncertainty.

To get an idea of the scope of the shrinkage of the opportunity space due to state-based conflict, the impact of conflict on GDP and GDP growth can be considered. de Groot et al. (2022) found that, in the absence of violent conflict in the world since 1970, global GDP would have been 12% larger in 2014. This implies that violent conflict reduces annual GDP

growth by around 0,9% on average. Collier (1999) found that civil war reduces annual growth rates in conflict affected countries by 2.2% on average. As far as the impact on a firm-level is concerned, Dimitriadis (2021) found that being proximate to violent conflict decreased firm profits by 20% in Togo.

The shrinkage of the opportunity space by conflict tends to be accompanied by an increase in the costs of starting up a new venture, and the costs of doing business. These cost-push effects are due to more uncertainty and risk, governments trying to expand their tax nets, increased bureaucratic surveillance, and lower trust (Amorós et al., 2017; Naudé et al., 2013).

2.4.2 Channels of impact

Generally, from the literature on the economic impacts of violent conflicts, such as a state-based conflict, we can derive the following channels of impact on entrepreneurship.

The first is a reduction of production and consumption. Production is often curtailed due to inputs - capital, labour, and land for instance - not being able to be used productively anymore. Conflict can directly destroy these inputs, and divert their uses from production to war - think of labour being conscripted into military service, or land and vehicles being expropriated by the military. This may cause firms to reduce innovation activities - they may even regress in terms of the technologies they adopt (Collier and Duponchel, 2013). Moreover, having to afford security measures, and facing higher operating costs due to unreliable infrastructure services and disrupted utilities, places an increased financial and managerial burden on firms.

The net effect on the entrepreneur may be, as Hiatt and Sine (2014, p.774) describe it, to foster

> "[...] erratic behavior among suppliers, customers, and creditors, making it difficult for new ventures to operate. Given that new ventures often have fewer slack resources than established firms to shield them from abrupt changes in supplier, customer, and creditor behavior [...] such disruptions are likely to lead to venture failure."

Thus, higher rates of firm failure in countries in conflict should be no surprise. Firms may also temporarily downsize, or temporarily cease operations, or move these elsewhere - even

abroad - as the literature indeed confirms (Camacho and Rodriguez, 2013; Petracco and Schweiger, 2012; Hiatt and Sine, 2014).

When entrepreneurs shut down their operations and migrate it will add to the brain drain which countries in conflicts inevitably experiences (Desai et al., 2021). As refugees, and as diaspora entrepreneurs, these migrants may provide "diaspora remittances" to support left-behind family members. Some of these remittances may also be used to support entrepreneurship in their home country (Naudé et al., 2017). They may also provide financial resources from abroad to support the conflict. Brinkerhoff (2011) for example reports that diaspora remittances to Liberia were as large as its entire GDP in 2007, and that 45% of domestic household incomes during Kosovo's civil war in the late 1990s came from remittances.

Consumption decreases as incomes fall, assets deteriorate, and a precautionary motive raise saving rates. Reduced production and consumption in turn will reduce the opportunities for profitable venturing, thus leading to further entrepreneurial failures and a reduction in investment for firm growth and innovation.

The second channel of state-based conflict on entrepreneurship is through reducing the effectiveness of public expenditure. Public expenditure, on roads, schools, hospitals, and telecoms are crucial to support entrepreneurial ventures, and the reduction in such effectiveness makes it more difficult to transact via markets. It raises the costs of starting a new business and running an existing business.

A third channel is through diverting government expenditure towards the conflict - including raising government expenditure. This potentially crowds out private investment. Private equity and loans for working capital tend to shrink and become more expensive.

A fourth channel is through supply chain disruptions. International trade and foreign direct investments are early "casualties" of violent conflict and the uncertainty surrounding it (Polachek, 1980). This affects access to inputs, to foreign markets, and to foreign capital and know-how. International entrepreneurship - through for example exporting - would decline to the extent that supply chains are disrupted by conflict (Petracco and Schweiger, 2012). Often, importers are more negatively affected by non-importers due to violent conflict (Mirza et al., 2021).

Mirza et al. (2021) using World Bank Enterprise Survey (WBES) data from the Middle East and North Africa found evidence that all of the above channels are important on the firm

level. They also found that conflict makes it more difficult for entrepreneurs to find workers, due to the brain drain, and that smaller firms are often burdened with a greater cost and tend to be more fragile against conflict, whereas larger firms have more resources to lean on. However, larger firms are more frequently targeted than small firms during conflict.

Petracco and Schweiger (2012), using World Bank Business Environment and Enterprise Performance Survey (BEEPS) data, studied the impact of the August 2008 war between Georgia and Russia on the performance of Georgian firms. They found significantly negative impacts on sales, exports, and employment - down by respectively 10%, 15% and 6% - and that smaller and younger firms were more adversely impacted.

Nagler and Naudé (2017) using geo-referenced LSMS-ISA data from Uganda found that firm productivity levels were lowest in the Northern region, which experienced violent conflict between 1987 and 2006. Thus, not only do firm productivity suffer, but the impact can persist for a long time.

Finally, state-based conflict can spill over borders. Entrepreneurship in countries neigbouring on those in conflict will also be affected - through many of the same channels discussed here (Murdoch and Sandler, 2004). Whereas negative effects could include implications for rising state non-productive expenditure, uncertainty, spillover effects, e.g., refugee streams, as well as supply chain disruptions, there can also be positive effects. These can include opportunities in safety and security provision (including in armaments), export opportunities due to reduced production, and growing demand for weapons, in the conflict affected countries.

2.4.3   Impact on women entrepreneurs

While violent conflict negatively impacts on all productive entrepreneurs, male and female, women entrepreneurs face three dimensions of conflict that needs to be highlighted and considered in support and peace-building efforts.

The first is that women are often pushed, involuntary, into entrepreneurship to provide for their families, because the men are pulled into combat (Anugwom, 2011; Minniti and Naudé, 2010).

The second is that women-run small firms are often easy targets during conflict, and/or affected due to the often more labour and service-intensive sectors of business where women-

owned firms tend to be most active in developing countries (Anugwom, 2011; Muhammad et al., 2017; Nagler and Naudé, 2017). As related by Muhammad et al. (2017, p.11) in a study of women entrepreneurs in a conflict-affected region of Pakistan, the "women live in daily fear regarding insurgents who persistently threaten them and discourage them from operating, and certainly from growing, businesses in the open market." Women may also face a higher risk of falling victim to domestic violence during times of conflict (Ekhator-Mobayode et al., 2020).

The third is that, after war, many women are left widowed, with little choice but to assume additional roles, including that of entrepreneur, to ensure the livelihood of their families (Ayadurai and Sadiq Sohail, 2006; Brück and Schindler, 2009). In all these dimensions, women also tend to experience high levels of role conflict (Hundera et al., 2021).

2.4.4 Coping and resilience

How entrepreneurs cope with the impacts of state-based conflicts is an important topic from the perspective of ensuring their survival, providing livelihoods to households during conflict, and to support post-conflict reconstruction (Addison and Brück, 2009). While conflict leads to higher rates of firm failure, and declines in firm productivity, innovativeness, international trade participation, job creation and firm performance, not all entrepreneurs are equalled affected. Some show more resilience.

Often, indicators of entrepreneurship such as self-employment rates or necessity-motivated entrepreneurship rates will increase in conflict affected regions (Amorós et al., 2017). This is because conflict reduces opportunities for wage employment, and self-employment becomes a coping / survival mechanism (Brück et al., 2013).

Some entrepreneurs may however benefit - and perceive more opportunities. Thus, one may also see opportunity-motivated entrepreneurship rates rise, more often over the short-term only, during conflict. After conflict has ended, the resumption of normalized business from a low base often sees a sharp upturn in entrepreneurship rates - it has been labelled a "Phoenix-factor" (Organsk and Kugler, 1977).

The heterogeneity of entrepreneurship during and after conflict has begged the question: can we identify factors that may improve firm resilience in conflict-affected areas?

Several factors have been identified as mediating factors. Availability of slack financial re-

sources, and general adaptability (reflected in the quality of entrepreneurial talent) are two key factors associated with better entrepreneurial resilience in the face of conflict (Dimitriadis, 2021; George, 2005). Social capital has also been identified as potentially important - entrepreneurs with more extensive and robust social capital tend to be more likely to survive conflict and contribute to post-conflict reconstruction (Sserwanga et al., 2014). However, social capital may also be eroded or damaged by conflict, and social capital may be a channel through which uncertainty is spread (Dimitriadis, 2021). Generally, smaller firms, very young, and very old firms tend to have access to fewer resources and are less adaptable. They therefore would bear the brunt of violent conflict. The firms most likely to survive violent conflict are thus middle-aged (experienced and networked) and larger firms (more resources) (Naudé et al., 2013, p.5).

2.5   The impact of entrepreneurship on state-based conflict

The possible impact in the other direction - from entrepreneurship to state-based conflict, is not implied in the definitions as stated, so far. Therefore, it is useful to revert to Baumol's definition of entrepreneurs as "persons who are ingenious and creative in finding ways that add to their own wealth, power, and prestige" (Baumol, 1990, p.987). He made a distinction between productive, unproductive, and destructive entrepreneurship. Increasing one's wealth, power and prestige raises one's private benefit, but not necessarily that of society. Only in the case of productive entrepreneurship (for example the traditional image of the innovative, job-creating, problem-solving entrepreneur) is the social and private benefits aligned. Indeed, as Baumol (1990, p.894) remarked, "At times the entrepreneur may even lead a parasitical existence that is actually damaging to the economy."

This is a useful point to consider when considering how entrepreneurship affects state-based conflict. For example, entrepreneurship would be destructive when talent is allocated towards predation and illegal activities (e.g., theft, smuggling, small arms illicit trade) rather than productive activities (Marsh and McDougal, 2021); it would be unproductive when talent is allocated towards rent-seeking, regulatory capture, or merely evading the authorities (Elert and Henrekson, 2016). What entrepreneurs do therefore clearly matters for their impact on society: As Joseph and van Buren (2022, p.1558) put it "conflict zone entrepreneurs- local entrepreneurs running small businesses in conflict settings - have paradoxical impacts on stability: holding the ability both to foster peace but also to enhance conflict."

Thus, state-based conflict will affect entrepreneurship through its impact on opportunities

and their utilization, and entrepreneurship in turn, would affect state-based conflict depending on whether and how talent is allocated towards either productive, unproductive, or destructive forms of entrepreneurship.

Essentially, the relation between state-based conflict and entrepreneurship hinges on the allocation of talent, particularly entrepreneurial talent.[9] This means that the mechanisms (institutions/ reward structures) ultimately determining that allocation provides a perspective from which to understand both the causes of conflict and entrepreneurial performance, as well as the possible solutions to avoid countries falling into, and remaining in, conflict-underdevelopment traps (Banerjee and Newman, 1993; Mehlum et al., 2003; Murphy et al., 1991; Sanders and Weitzel, 2013).

Changing the institutions that incentivizes the allocation of talent is a complex challenge. It is path-dependent and subject to multiple self-reinforcing equilibria. In the context of state-based conflict, "the conflict itself, by reducing economic growth, can tilt incentives in a society for talented entrepreneurs to engage in activities that will further undermine growth. This leaves open the possibility for entrepreneurial behavior to lead to an underdevelopment trap if violent conflict becomes significant" (Brück et al., 2013, p.10).

Finally, entrepreneurship can positively influence peace and reduce state-based conflict by providing alternatives to potential combatants to participate in war, and by reducing the incentives for violent conflict by levelling the playing field. Post-conflict entrepreneurs can contribute to peace-building through providing jobs, by including minorities in their activities, and by offering routes out of poverty. Such entrepreneurs have been referred to as peace entrepreneurs or pro-peace entrepreneurs, and have been associated with social entrepreneurship (Joseph and van Buren, 2022).

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[9]Entrepreneurial talent consists of human capital (reflected by education and experience), social capital, and cognition (Baptista et al., 2007). Kihlstrom and Laffont (1979) list being less risk-averse and open to uncertainty as key aspects of entrepreneurial talent. Entrepreneurial talent has been measured by an entrepreneur's opportunity orientation, resource orientation, management flexibility, reward philosophy, growth ambitions, education, experience, and entrepreneurial culture (Mezzour and Autio, 2007).

3 Methodology

3.1 Estimating equation

In the previous section we summarised the literature on the relationship between state-based conflict and entrepreneurship. Based on this we now posit that the determinants of opportunity (productive) entrepreneurship share is a function of the level of development (which can be interpreted as a proxy for institutions and of opportunities), the size of the market (reflecting the opportunity set for entrepreneurs), the knowledge base (skills, technology and innovation, which reflects the resources to seize risky opportunities), institutions that protects property rights, enforces contracts, and promote freedom and financial development, the physical capital base, culture, and macroeconomic stability. The relationship is described with equation (1):

$$e_{i,t} = \alpha_{i,t} + \sigma e_{i,t-1} + \beta^{'} X_{i,t} + \delta^{'} Y_{i,t} + \gamma_i + \theta_t + \epsilon_{i,t} \tag{1}$$

where $e_{i,t}$ is our measure of entrepreneurship (see Table 1 below for measures and sources of data). We include a lagged value of this measure to reflect the possibility of persistence in entrepreneurship, at least over the short-term, given that the literature on conflict and entrepreneurship have identified this as a possibility (see e.g., Brück et al. (2013)). $X_{i,t}$ is our measure of state-based armed conflict; $Y_{i,t}$ control variables based on theory; γ_i country fixed-effects; θ_t time fixed-effects; and $\epsilon_{i,t}$ a random disturbance term.

3.2 Hypotheses

From the literature review, we can formulate the following hypotheses:

Hypothesis 1: State-based conflict ($X_{i,t}$) has a negative association with productive (and opportunity-motivated) forms of entrepreneurship, which will be reflected in equation (1) in $\beta^{'} < 0$.

Hypothesis 2: State-based conflict ($X_{i,t}$) has a positive association with unproductive forms (and necessity-motivated) forms of entrepreneurship, which will be reflected in equation (1) in $\beta^{'} > 0$.

Empirically, our strategy is to estimate (1) and evaluate whether $\beta' < 0$ or $\beta' > 0$ using various measures of entrepreneurship and state-based conflict.

We discuss that the data that we will use to estimate (1) below in section 3.2, and our estimating strategy and estimators in section 3.3.

3.3 Data and variables

Our data consists of an unbalanced panel of 91 countries spanning the period 2001-2018. The choice of countries and time is determined by the availability of data on start-up entrepreneurship (early-stage entrepreneurial activity) as captured in GEM. Although GEM has conducted adult-based randomized population surveys that covered 115 countries over the past 22 years, we only included countries in our analysis where GEM carried out 2 or more surveys over the period. Table 1 summarises our state-based conflict variables and measures for $X_{i,t}$ and our measures for start-up entrepreneurship and self-employment.

Table 1 notes that we measure state-based conflict with the number of battle-related deaths occurring in a particular year, sourced from the Uppsala Conflict Data Program (UCDP) Battle-Related Deaths Dataset version 21.1. For a discussion of this dataset see Pettersson et al. (2021).

A measure of the militarization of society - an opportunity cost of war - is the share of GDP spend on military. In Table 1 we list military expenditure as a second measure of state-based conflict. The measure is obtained from the World Bank, who sources it from the Stockholm International Peace Research Institute (SIPRI) Yearbook: Armaments, Disarmament, and International Security.[10] SIPRI uses the NATO[11] definition of military expenditure. This classifies all current and capital expenditures on the armed forces as military expenditure, including salaries for armed forces personnel.

Table 2 summarises our control variables and measures. We chose these variables based on section 2, as well as pragmatic decisions to ensure adequate degrees of freedom, avoid multicollinearity, and more generally obtain as parsimonious model as possible to describe the data generation process. Our choice was made based on the best measures that we could find in terms of reliability, availability, and appropriateness to capture the determinants of entrepreneurship.

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[10]See https://www.sipri.org/yearbook

[11]See https://www.nato.int/cps/en/natohq/topics_49198.htm.

Table 1: State-Based Conflict and Entrepreneurship Variables and Measures, 2001-2018

Variable	Description	Source
State-based conflict		
battledeaths	Battle-related deaths - number	UCDP Battle-Related Deaths Dataset version 21.1, best estimate of number of battle related deaths
milexp	Military expenditure as % of GDP	World Bank Development Indicators online, series MS.MIL.XPND.GD.ZS. Sourced from SIPRI Yearbook: Armaments, Disarmament, and International Security
Entrepreneurship:		
tea-opp	Total entrepreneurial activity motivated by opportunity - %	Global Entrepreneurship Monitor (GEM)
tea-necc	Total entrepreneurial activity motivated by necessity - %	GEM
tea-opp-m	Total entrepreneurial activity motivated by opportunity per male - %	GEM
tea-necc-m	Total entrepreneurial activity motivated by necessity per male - %	GEM
tea-opp-f	Total entrepreneurial activity motivated by opportunity per female - %	GEM
tea-necc-f	Total entrepreneurial activity motivated by necessity per female - %	GEM
self-emp-r	Self-employment rate (% of total employment)	International Labor Organization (ILO)
employers-r	Employers in self-employment (% of total employment)	ILO
own-acc-r	Own-account workers in self-employment (as % of total employment)	ILO

Source: Authors

In section 2.2 we concluded that cross-country differences in entrepreneurship are determined by the institutional environment (proxied by GDP per capita), the size of the market (proxied

by population size and trade openness), skills, innovativeness and productivity (proxied by human capital, total factor productivity), the opportunity cost of entrepreneurship (proxied by unemployment), the availability of finance (proxied by domestic credit to the private sector by banks), startup costs and regulations (measured by the cost of business start-up procedures) and physical investment / uncertainty (proxied by the capital stock). We include GDP (and its square) reflecting the relationship between development level and entrepreneurship, which has been found to be U-shaped (Wennekers et al., 2010).

Table 2: Control Variables and Measures

Variable	Description	Source
gdppc	GDP per capita (constant 2015 US$)	World Bank (WDI Online) - series NY.GDP.PCAP.KD
pop	Total population	World Bank (WDI Online) - series SP.POP.TOTL
trade	Trade (% of GDP)	World Bank (WDI Online) - series NE.TRD.GNFS.ZS
credit	Domestic credit to private sector by banks (% of GDP)	World Bank (WDI Online) - series SL.UEM.TOTL.ZS
capstock	Capital stock at constant 2011 national prices (in mil. 2011US$)	Penn World Table, version 9.1: Feenstra, Robert C., Robert Inklaar and Marcel P. Timmer (2015)
unemp	Unemployment, total (% of total labor force) (modelled ILO estimate)	World Bank (WDI Online) -series SL.UEM.TOTL.ZS
hc	Human capital index, based on years of schooling and returns to education	Penn World Table, version 9.1: Feenstra, Robert C., Robert Inklaar and Marcel P. Timmer (2015)
tfp	Total Factor Productivity (TFP) at constant national prices (2011=100)	WPenn World Table, version 9.1: Feenstra, Robert C., Robert Inklaar and Marcel P. Timmer (2015)
startcost	Cost of business start-up procedures (% of GNI per capita)	World Bank (WDI Online)

Source: Authors

3.4 Estimating strategy and estimators

Given that we have (unbalanced) panel data and would like to exploit this structure of the data, and account for country-fixed effects the natural choice of estimator is a Fixed-Effects (FE) estimator.[12] To also account for time fixed effects, we included time dummies. This allows us to avoid biased estimates due to changes in unobservable variables over time. A Wald-test to test on the coefficients of the time dummies rejected the null is that these are jointly zero, which confirmed that using time-fixed effects is appropriate. Furthermore, post-estimation, we performed a Wooldridge test for autocorrelation in panel data[13] after each FE model.

Because we would also like to take into account the existence of possible endogeneity of our regressors, we also chose to use a systems Dynamic Panel Data (DPD) model, which uses a Generalized Method of Moments (GMM) estimator - see e.g., Arellano and Bover (1995) and Blundell and Bond (1998).[14] Post-estimation we performed Sargan-Hansen tests (see Hansen (1982) for overidentifying restrictions to evaluate whether the instrumental variables used to avoid possible endogeneity bias, are valid.

4 Empirical Results

4.1 Descriptive statistics

Tables 1 and 2 listed our variables and their data sources of data. In this section we provide three sets of descriptive statistics which can already illuminate the relationship between armed conflict and entrepreneurship and help us evaluate our hypotheses. The first set of descriptive statistics summarizes our variables. The second set splits our sample of countries into those that experienced state-based armed conflict between 2001 and 2018, those that did not, and those that had been in conflict (post-conflict) in the past during our sample period, but who did not experience any conflict for at least the most recent five-years - i.e., from 2013. The third set of descriptive statistics provides graphical, visual explorations of the relationship between our variables, where this is possible.

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[12]This estimator is implemented with the *xtreg* command in STATA.
[13]See Wooldridge (2002) and Drukker (2003). Implemented using *xtserial* in STATA.
[14]This estimator is implemented with the *xtdpdsys* command in STATA.

4.1.1 Summary statistics and correlations

Table 12 in Appendix A contains a summary of our variables. From this can be seen that we have, in most cases, more than 1,000 observations for each variable. The notable exception is for the variable battle-related deaths, for which we have 221 observations. This is because not all 91 countries experienced state-based conflict during the period. Nevertheless, we still have valuable observations that can help deepen our understanding of the relationship between various type of entrepreneurship and conflict. In our sample of 91 countries, 19 countries experienced state-based conflicts as measured by more than 25 battle-related deaths per year. These conflicts resulted in at least 134,506 battle-related deaths between 2001 and 2018.

Battle-related deaths is a direct measure of ongoing conflict and the intensity of conflict. State-based conflict, however, can also impose indirect and longer-lasting impacts, even after, or before, any battle-related deaths are recorded. This could be, as we explained in section 2, through the militarization of the state. We measure this militarization of the state through the share of military expenditure in GDP. Table 12 in Appendix A show that on average in our sample countries spent 1.9% of GDP on the military.

From Table 12 in Appendix A, we can also see that our measures of entrepreneurship tend to differ significantly - confirming that they are measuring different aspects of entrepreneurship. Our static measure of entrepreneurship indicates that on average, 31% of the labor force in our sample were self-employed - a substantial share. Most of these were own-account workers (27%) with only 4,04% being employers. This reflects that self-employment is largely a residual sector (of "last resort") and tend to reflect survivalist, low-productivity, entrepreneurship. In contrast, being an employer in self-employment is much harder, and reflects job-creating, "productive" entrepreneurship.

Our dynamic measure of entrepreneurship - total entrepreneurship activity (tea) - which measures early stage, startup activity - indicates that on average 11,23% of the adult population in our sampled countries were engaged in new entrepreneurial activity. 7,93% of this was motivated by opportunity, and 2,91% out of necessity. While opportunity-motivated start-up entrepreneurship is also much scarcer than self-employment, it is a bit more prevalent than employers in self-employment, reflecting that it may be somewhat easier to start a new venture than to grow and maintain it.

Table 12 in Appendix A also contain summary measures of our control variables. Thus,

we can see that the average country in our sample had a GDP per capita per year that is relatively high at US$19,442 (but with a large standard deviation), has about 63 million inhabitants (thus large countries), an unemployment rate of 8,14% and start-up costs that amounted to 21% of GNI per capita (again with a large standard deviation).

4.1.2 Contrasts between countries in conflict and those not in conflict

A second set of descriptive statistics split our sample of countries into those that experienced state-based conflict during the period 2001-2018 from those that did not, and from those that can be classified as post-conflict. The latter would be countries that had been in conflict during the period under study but had at least no battle-related deaths for a period of five years before the end of the period, i.e., after 2013. We use the UCDP/PRIO variable on the number of battle-related deaths per year, to classify whether a country had been in conflict or not.

Over our sample period, 19 countries had experienced conflict according to this measure, with 15 countries considered at the end of the period to be still in conflict, and 4 that were post-conflict countries. Appendix B, Table 13 lists the countries in our sample that were in conflict, post-conflict, and not in conflict.

Although the United States is a country in conflict, we dropped it from our sample - the fighting where the US is involved is not on its own soil, unlike the case for the other countries in the sample. Table 13 shows that the countries in conflict most affected in the sample in terms of battle-related deaths were Pakistan (29,000), Nigeria (18,000), India (17,000) the Philippines (10,000) and Colombia (10,000).

Table 3 below makes a comparison between countries in conflict, not in conflict, and post-conflict in terms of the key entrepreneurship and related measures. Table 3 indicates several significant differences between countries in conflict and those not in conflict. Most notable is that self-employment is almost twice as prevalent in countries in conflict and post-conflict countries. In countries with no conflict, self-employment rates average 25%; in countries in conflict and post-conflict countries, this rises to respectively 53% and 60%. The ratio of opportunity-to-necessity motivated startup entrepreneurship is highest in countries that experienced no conflict, and lowest in countries with conflict. Necessity motivated entrepreneurship is highest in post conflict and conflict countries. These findings are all consistent with our hypotheses.

Table 3: Countries by status in conflict

	Status		
	No Conflict	Post-Conflict	In Conflict
GDP per capita (US$)	23.280	3.788	5.587
Military expenditure (%)	1,70	1,91	2,67
Startup costs	13,16	140,64	35,80
tea-opp/tea-necc	2,90	2,83	2,19
tea-necc	2,46	6,16	4,75
self-emp-r	24,77	60,30	52,60
employers-r	4,03	4,16	4,01

Source: Authors' compilation based on GEM, World Bank Development Indicators and ILO Stat data

It is also notable in Table 3 that start-up costs, as % of GNI per capita, is three times higher in countries in conflict and ten times higher in post-conflict countries. Furthermore, military expenditure is higher in countries in conflict and in post-conflict countries, reflecting that these countries are (or remain) more militarized. We see from Table 3 that there is a slightly higher rate of employers in self-employment in post-conflict countries than in countries in conflict or in countries without conflict. This may reflect a Phoenix-factor operating in post-conflict countries, as explained in section 2.

In sum, countries that incurred state-based conflict over the period 2001 to 2018 had relatively more necessity / non-productive entrepreneurship and self-employment, were more militarized, were substantially poorer, and had high barriers to entrepreneurial entry. These outcomes are indicative huge human, economic and business costs associated with state-based conflict.

4.1.3 Graphical analysis

Finally, as a third set of descriptive statistics we provide a graphical, visual exploration of the relationship between our variables of interest. We start by unpacking one of the findings reported in Table 3, namely that necessity-motivated start-up entrepreneurship is on average higher in countries in conflict than in countries not in conflict: 4,75% vs 2,46% . In other words, necessity motivated entrepreneurship rates are on average 193% higher in countries in conflict.

To unpack this further we note that the GEM database contains a split of the necessity-motivated start-up rates between male and female entrepreneurs. In Figure 4 we provide scatterplots from the data to explore whether male and female entrepreneurs' motivations

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are impacted differently by state-based conflict.

Figure 4: State-Based Conflict and Necessity Motivated Early-Stage Entrepreneurial Activity across Countries and Sex, 2001-2018

As shown in Figure 4, as the intensity of state-based conflict increases, as measured by the number of battle-related deaths, necessity-motivated entrepreneurship also increases - for both males and females. This is tentative (visual) confirmation of our hypothesis 1. The slope of the fitted line is only very slightly larger for female than male entrepreneurs: 0,17 compared to 0,14. Based on this we can conclude that the impact of state-based conflict on necessity-motivated start-up activity is virtually similar for male and female entrepreneurs.

It can also be seen that the intercept of the fitted line is higher in the case of male entrepreneurs than female - this reflects that in the sample the rate of necessity entrepreneurship is on average higher for males than females (3,2% compared to 2,7%), although the variation (spread) in female necessity entrepreneurship is higher (3,1% compared to 2,7%) as can also be seen from inspecting Figure 4.

We can also draw a scatterplot of the relationship between battle-related deaths and self-employment and employers in self-employment. This is depicted in Figure 5.

The two scatterplots in Figure 5 clearly show the different association between state-based

Figure 5: State-Based Conflict and Self-Employment and Employers in self-employment, 2001-2018
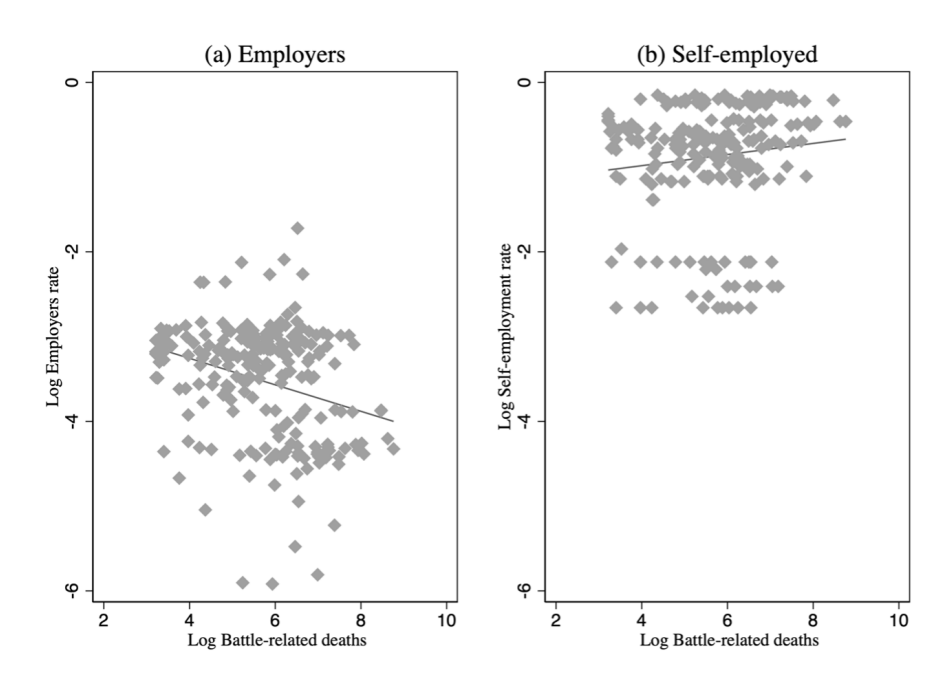
Source: Authors' compilation based on data from GEM and UCDP Battle-Related Deaths Dataset version 21.1

conflict and entrepreneurship: it has a positive relationship with unproductive, survivalist entrepreneurship as measured by the self-employment rate, and a strong negative relationship with productive, job-creation entrepreneurship levels. Hence, state-based conflict, as measured by battle-related deaths, is unambiguously negative for productive entrepreneurship. This is consistent with our hypotheses 1 and 2.

Is also instructive to consider patterns of entrepreneurship and armed conflict across certain individual countries over the period 2001 to 2018. This we provide in Figure 6 in **Appendix C**.

Figure 6 in Appendix C contains six graphs, for the countries in our sample for which we have continuous data on both entrepreneurship and battle-related deaths over the period 2001 to 2018. The countries are Algeria, India, the Philippines, Russia, Türkiye, and Uganda. In these six countries, the temporal dynamics of productive entrepreneurship (measured by employers in self-employment) and state-based conflict suggest an inverse relationship, even over the relatively short period under study. Thus, we can see that productive entrepreneurship tends to recover (illustrating the Phoenix factor) as the intensity of conflict decreases - sometimes quite dramatically, as for instance in the case of Uganda or India.

In conclusion, in this subsection, we presented three sets of descriptive statistical evidence on the relationship between state-based conflict and entrepreneurship. This indicated support for our hypotheses. To summarize, the average country in our sample had a GDP per capita per year that is relatively high at US$19,442, had about 63 million inhabitants (thus large countries), an unemployment rate of 8,14% and start-up costs that on average amounted to 21% of GNI per capita (with a large standard deviation). Countries that incurred state-based conflict that resulted in battle-related deaths exceeding 25 per year over the period 2001 to 2018 had more survivalist and non-productive entrepreneurship, were more militarized, and were substantially poorer. Furthermore, entrepreneurship appears to be able to rebound - productive entrepreneurship was suggested to recover fast in some countries when the intensity of conflict decreases, suggesting a "Phoenix" factor.

4.2   Regression results

In this section we report our regression results. We report the results from using Fixed Effect (FE) and Dynamic Panel Data (s-DPD) estimators. With the Fixed Effect (FE) estimator we used robust standard errors and included time fixed-effects, and as mentioned, post-estimation ran a Wooldridge test for autocorrelation in panel data. In the very few cases where it indicated the presence of first order autocorrelation (i.e., the test reject the null of no autocorrelation) we also ran a FE model that accounts for AR (1) autocorrelation; however we do not report these results, as it was not a common problem, but the results are available on request.

We organize the reporting of our results as follows. First, we report on the impacts of direct, on-going state-based conflict, as measured by battle-related deaths, on start-up entrepreneurship and on the levels of self-employment (sub-section 4.3.1). Second, we report on the impacts of a more indirect measure of conflict, namely the share of military expenditure in GDP, also on start-up entrepreneurship and on the levels of self-employment (section 4.3.2).

We split start-up entrepreneurship by motive, i.e., into opportunity-driven start-up entrepreneurship and necessity-driven start-up entrepreneurship, including making a gender split (section 4.3.3); and we split levels of self-employment into employers in self-employment and own-account workers.

Thus, for each category of entrepreneurship (start-up or levels) we have a productive and an

unproductive measure. As per section 2, our hypothesis is that state-based conflict will have a negative impact on productive entrepreneurship and a positive impact on unproductive entrepreneurship. Thus, state-based conflict will decrease opportunity start-ups and employment creating self-employment and increase the rates of necessity entrepreneurship and own account workers in the economy. In making the gender split in start-up entrepreneurship our underlying hypothesis is that female entrepreneurs will be more likely to be pushed into necessity entrepreneurship due to conflict than males (as per section 2). We posit that these effects will hold, even if we control for the general determinants of entrepreneurship, such as size of GDP and the market, start-up costs and level of development.

4.2.1   Impact measured by battle-related deaths

In Table 4 we present the regression results[15] for the impact of state-based conflict measure by battle-related deaths on start-up entrepreneurship. This shows that state-based conflict has no statistically significant impact on opportunity-driven startups; it has, instead, a significant and positive impact on necessity driven start-ups (see column 4). Financial development (*credit*) (as measured by credit extended to the private sector) has a positive impact on opportunity startups, and a negative impact on necessity startups. This clearly reflects that with accessible credit entrepreneurial activity will be allocated more in favour of productive entrepreneurship - people can utilise opportunities and may have other options than having to start a business out of pure necessity. The capital stock (*capstock*) has the opposite effect, and total factor productivity (*tfp*) likewise has an impact of facilitating necessity startups in the presence of conflict. This suggests that the availability of physical capital and technological innovation (to the extent that *tfp* growth reflect the latter) can facilitate necessity enterprise establishment during conflict. Startup cost (*startup costs*) is not significant for opportunity startups, but has a positive, and robust relationship with necessity startups in the presence of battle-related deaths. This could be reflective of a deteriorating context for doing business - as section 2 found, costs of doing business tend to increase during conflict, so one could see both increasing start up costs, and increasing necessity entrepreneurship, simultaneously.

Table 5 contains the results of the impact of state-based conflict (as measured by battle-related deaths) on levels of self-employment. It can be seen state-based conflict has a small, but positive, impact on employers in self-employment. This is, however, not robust across estimators. More robust is that, in the presence of state-based conflict, that human capital (*hc*)

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[15]We report the within-R^2 in the case of the FE estimates because this measures the variation in the entrepreneurship variables within country-units that is captured by our model.

Table 4: Regression results: Impact of battle-related deaths on start-up entrepreneurship

	tea-opp:		tea-necc:	
	(1) S-DPD	(2) FE, robust	(3) S-DPD	(4) FE, robust
Lagged tea	-0.37	-0.00	0.17	-0.87
	(-1.68)	(-0.03)	(0.73)	(-1.45)
Battle-related deaths	-0.01	-0.06	0.00	**0.37***
	(-0.04)	(-0.25)	(0.01)	(2.07)
gdppc	**15.10***	-12.40	8.47	-55.8
	(2.19)	(-0.58)	(1.43)	(-1.64)
gdppc2	**-0.82***	0.55	**-0.62***	3.13
	(-2.14)	(0.46)	(-1.90)	(1.45)
pop	-4.80	57.75	**-15.04***	**-279.7***
	(-1.18)	(0.32)	(-2.15)	(-1.87)
pop2	0.17	-1.70	0.31	**9.16***
	(1.53)	(-0.29)	(1.83)	(1.89)
trade	0.18	0.04	-0.11	-0.34
	(0.35)	(0.04)	(-0.18)	(-0.27)
credit	**1.25****	1.24	**-1.40***	**-2.10****
	(2.72)	(0.91)	(-1.92)	(-2.00)
capstock	**-1.57***	3.34	**2.94***	-6.14
	(-2.70)	(0.20)	(2.33)	(-0.71)
unemp	-0.08	0.18	-0.26	**-0.70***
	(-0.38)	(1.43)	(-0.81)	(-2.00)
tfp	0.54	1.13	1.99	**9.12****
	(0.22)	(0.09)	(0.73)	(2.22)
hc	-2.39	-4.66	0.42	**-0.67***
	(-1.57)	(-0.12)	(0.22)	(-2.00)
startup costs	-0.17	-0.20	0.33	**1.01****
	(-0.71)	(-0.32)	(1.32)	(3.47)
constant	-12.20	-470.1	105.9	-2415.3
	(-0.49)	(-0.29)	(1.91)	(-0.11)
Time-FE	NO	YES	NO	YES
N	47	47	47	47
Within R^2	n/a	0.80	n/a	0.36
Sargan test	$\chi^2=21.13$	n/a	$\chi^2=23.39$	n/a

z-and t-statistics in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Wooldridge test for autocorrelation in panel data insignificant.

has a negative association with the rate of employers in self-employment. This suggests that in countries with higher levels of human capital, state-based conflict has a more depressing impact on productive, job-creating, entrepreneurship. Whereas higher startup costs (*startup costs*) were positively associated with necessity-motivated startups during conflict (see Table 4), the results in Table 5 indicates a negative relationship between own account workers and startup costs during state-based conflict.

Table 5: Regression results: Impact of battle-related deaths on self-employment

	employer-r:		own-acc-r:	
	(1) S-DPD	(2) FE, robust	(3) S-DPD	(4) FE, robust
Lagged tea	0.81***	0.68***	0.89***	0.55***
	(14.78)	(9.11)	(16.69)	(4.66)
Battle-related deaths	0.01**	0.01	-0.00	-0.00
	(2.12)	(1. 21)	(0.28)	(-0.73)
gdppc	0.58	-2.35**	0.27	2.31*
	(1.09)	(-3.01)	(0.46)	(2.33)
gdppc2	-0.03	0.14**	-0.02	-0.13*
	(-0.85)	(2.52)	(-0.59)	(-2.14)
pop	0.25	-3.79	1.14	7.69***
	(0.44)	(-1.35)	(1.68)	(3.13)
pop2	-0.00	0.09	-0.03	-0.21**
	(-0.25)	(1.05)	(-1.57)	(-2.90)
trade	0.01	-0.01	0.08	0.18
	(0.12)	(-0.14)	(1.63)	(1.35)
credit	-0.02	-0.02	-0.03	-0.09
	(-0.47)	(-0.53)	(-0.74)	(-1.54)
capstock	-0.15	0.27*	-0.01	-0.08
	(-1.56)	(1.33)	(-0.12)	(-0.42)
unemp	-0.03	-0.10***	0.02	0.05*
	(-1.22)	(-4.11)	(0.89)	(2.55)
tfp	-0.09	0.43	-0.14	-0.42*
	(-0.44)	(1.70)	(-0.61)	(-2.08)
hc	-0.48**	-1.03**	0.19	0.47
	(-2.45)	(-2.93)	(0.96)	(1.49)
startup costs	-0.03	-0.04	-0.02	-0.05**
	(-1.54)	(-0.90)	(-0.81)	(-2.59)
constant	-4.25	44.05	-11.56*	-80.8***
	(-1.07)	(1.62)	(-2.34)	(-3.06)
Time-FE	NO	YES	NO	YES
N	108	108	108	108
Within R^2	n/a	0.84	n/a	0.84
Sargan test	χ^2=90.37	n/a	χ^2=66.85	n/a

z-and t-statistics in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Wooldridge test for autocorrelation in panel data significant.

Table 5 furthermore shows that labor market conditions matter. Higher unemployment (*unemp*) is associated with a reduction of employers in self-employment, but with an increase in the share of people operating as own account workers. Thus, state-based conflict in countries with high unemployment would put productive entrepreneurship under even more pressure. Interestingly, Table 5 suggests that in the presence of state-based conflict, population size (*pop* and *pop2*) has an inverted U-shape relationship with own account workers, implying

that in more populous countries, state-based conflict is associated with a higher share of workers operating as own account workers. This effect is, however, concave, meaning that after a certain population level, the share of own account workers will decline. Finally, in contrast with the effects of state-based conflict on shorter term, start-up activities (as in Table 4), self-employment levels are persistent over time in the presence of state-based conflict, as indicated by the significant and positive coefficients on the lagged dependent variables (*lagged tea*).

4.2.2   Impact measured by military expenditure

Table 6 contains the regression results for the impact of state-based conflict, as measured by military expenditure, on start-up entrepreneurship. Military expenditure has a significant negative impact on opportunity driven start-ups. This is as we expected, and is consistent with our hypothesis 1. It has no significant impact on necessity driven start-ups. Moreover, in the case of opportunity start-ups, a significant U-shape relation with GDP is clear, as well as a significant and positive association with human capital levels. This suggests that higher levels of development (e.g. in GDP and human capital) can somewhat reduce the negative impact of militarization: from an entrepreneurship point of view, richer and more educated) countries can better afford militarization. Lagged values of the dependent variables are positive and significant, indicating the persistence of start-up entrepreneurship over the short term (1 year) in the presence of militarization.

Table 7 contains the results of the impact of state-based conflict, as measured by military expenditure, on levels of self-employment. Military expenditure has no significant impact on any of the self-employment measures. We can however see from Table 7 that higher levels of financial development (*credit*), capital stock (*capstock*) and total factor productivity (*tfp*) are negatively associated with self-employed employers (productive entrepreneurship). Financial development is furthermore positively associated with own account workers. Given that self-employment rates are, in contrast to start-up rates (as in Table 6) longer-term indicators of entrepreneurship, these results may be interpreted as follows. It suggests namely that higher military expenditure will not only depress opportunity-motivated startups over the short-term (Table 6) but also crowd-out job-creating entrepreneurship over the longer-term.

Table 6: Regression results: Impact of military expenditure on start-up entrepreneurship

	tea-opp:		tea-necc:	
	(1) S-DPD	(2) FE, robust	(3) S-DPD	(4) FE, robust
Lagged tea	**0.09***	0.12	**0.41***	**0.35***
	(1.78)	(1.68)	(7.19)	(4.99)
Military expenditure	**-0.39***	**-0.44***	-0.05	-0.13
	(-3.16)	(-2.10)	(-0.24)	(-0.64)
gdppc	**-6.24***	-3.54	3.89	1.89
	(-3.71)	(-1.35)	(1.16)	(0.36)
gdppc2	**0.29***	**0.29***	-0.21	-0.10
	(3.52)	(2.05)	(-1.28)	(-0.38)
pop	**1.92***	-6.79	0.12	0.76
	(2.59)	(-0.95)	(0.06)	(0.08)
pop2	**-0.07***	0.17	0.02	0.02
	(-2.96)	(0.78)	(0.31)	(0.06)
trade	0.16	0.39	0.20	0.21
	(1.10)	(1.73)	(1.01)	(0.72)
credit	0.04	**0.32****	-0.05	-0.11
	(0.36)	(2.50)	(-0.23)	(-0.58)
capstock 0.46	-0.46	-0.57	-0.06	
	(1.50)	(-0.87)	(-1.03)	(-0.07)
unemp	**-0.28***	-0.02	0.00	0.26
	(-3.49)	(-0.15)	(0.02)	(1.70)
tfp	0.29	-1.14	0.26	0.48
	(0.45)	(-1.42)	(0.29)	(0.39)
hc	**2.58***	**2.01****	0.73	0.31
	(3.97)	(2.46)	(0.62)	(0.20)
startup costs	0.02	0.04	0.06	0.06
	(0.76)	(1.53)	(1.16)	(1.20)
constant	**14.39***	76.40	18.26	-27.10
	(2.18)	(1.20)	(-0.95)	(-0.28)
Time-FE	NO	YES	NO	YES
N	456	456	456	456
Within R^2	n/a	0.36	n/a	0.26
Sargan test	χ^2=187.9*	n/a	χ^2=163.2*	n/a

z-and t-statistics in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Wooldridge test for autocorrelation in panel data insignificant.

4.2.3 Impacts on startup entrepreneurship by gender

The GEM collects data on early-stage entrepreneurial activity (tea) by gender and by gender and motivation (opportunity or necessity driven). We could therefore estimate the differential impact of state-based conflict on female and male start-up entrepreneurship. Table 8 reports the impact of state-based conflict as measured by battle-related deaths on the ratio of female

Table 7: Regression results: Impact of military expenditure levels of self-employment

| | employer-r: | | own-acc-r: | |
	(1) S-DPD	(2) FE, robust	(3) S-DPD	(4) FE, robust
Lagged tea	**0.76***	**0.77***	**0.96***	**0.80***
	(21.70)	(19.43)	(39.22)	(13.17)
Military expenditure	0.05	0.01	-0.04	-0.02
	(1.70)	(0.23)	(-1.68)	(-0.81)
gdppc	-0.11	-0.16	-0.28	0.30
	(-0.35)	(-0.51)	(-0.68)	(0.92)
gdppc2	0.02	0.01	0.01	-0.01
	(1.27)	(0.54)	(0.68)	(-0.76)
pop	0.12	0.79	0.29	1.38
	(0.41)	(0.95)	(1.41)	(1.68)
pop2	0.00	-0.02	-0.01	-0.04
	(0.30)	(-0.91)	(-1.47)	(-1.59)
trade	-0.01	0.02	-0.05	**-0.04***
	(-0.47)	(0.96)	(-1.78)	(-2.16)
credit	**-0.06****	0.00	**0.04***	0.01
	(-2.80)	(0.20)	(1.87)	(1.37)
capstock	**-0.20***	-0.05	0.02	-0.06
	(-3.67)	(-0.57)	(0.30)	(-1.08)
unemp	-0.01	-0.03	0.01	**0.02***
	(-0.55)	(-1.53)	(0.67)	(1.87)
tfp	**-0.27****	0.03	-0.11	-0.08
	(-2.64)	(0.31)	(-1.19)	(-1.63)
hc	-0.18	-0.01	**-0.36***	-0.17
	(-1.56)	(-0.06)	(-3.19)	(-1.34)
startup costs	-0.01	-0.01	-0.00	0.00
	(-0.87)	(-1.55)	(-0.60)	(0.73)
constant	-0.99	-6.09	-0.59	-12.49
	(-0.39)	(-0.80)	(-0.28)	(-1.69)
Time-FE	NO	YES	NO	YES
N	908	908	908	908
Within R^2	n/a	0.66	n/a	0.67
Sargan test	χ^2=245***	n/a	χ^2=284***	n/a

z-and t-statistics in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Wooldridge test for autocorrelation in panel data insignificant.

opportunity-and necessity-based start-ups to that of males.

Table 8 shows that state-based conflict does not significantly impact the ratio of female-to-male entrepreneurship. It also shows that the ratio of female-to-male opportunity-motivated entrepreneurship depends on GDP per capita, population and unemployment. The relationship with GDP per capita is U-shaped, which means that as per capita GDP increases, at first, the ratio of female-to-male opportunity-motivated entrepreneurs would decline to a cer-

Table 8: Impact of battle-related deaths on the ratio of female to male opportunity and necessity-driven start-ups

| | tea-opp-f-m: | | tea-necc-f-m: | |
	(1) S-DPD	(2) FE, robust	(3) S-DPD	(4) FE, robust
Lagged tea	-0.13	-0.36	**-0.80****	-0.45
	(-0.68)	(-1.59)	(-2.77)	(-1.16)
Battle-related deaths	-0.02	-0.05	2.07	0.59
	(-0.60)	(-1.18)	(0.89)	(0.23)
gdppc	**-8.75***	**-19.50*****	-26.02	89.74
	(-2.04)	(-4.23)	(-0.18)	(0.34)
gdppc2	**0.50***	**1.03***	-0.76	-11.73
	(2.00)	(3.38)	(-0.08)	(-0.77)
pop	**5.97***	-25.11	-46.46	**2711.7*****
	(2.04)	(-0.52)	(-0.20)	(3.35)
pop2	**-0.17***	0.81	0.34	**-83.88*****
	(-2.06)	(0.51)	(0.06)	(-3.37)
trade	-0.23	0.19	1.79	4.57
	(-1.09)	(0.55)	(0.15)	(0.45)
credit	0.14	0.19	5.73	36.42
	(0.78)	(0.58)	(0.42)	(1.83)
capstock	0.06	1.81	31.2	**226.8****
	(0.20)	(0.44)	(1.12)	(2.86)
unemp	**-0.26*****	0.01	4.97	0.44
	(-3.19)	(0.19)	(0.87)	(0.12)
tfp	1.23	3.75	-29.33	0.88
	(1.04)	(1.23)	(-0.55)	(0.01)
hc	0.46	5.78	**81.13****	**328.3***
	(1.03)	(0.72)	(2.54)	(1.83)
startup costs	0.00	-0.02	**9.19***	-0.76
	(0.00)	(-0.14)	(2.01)	(-0.22)
constant	-12.68	248.6	405.16	**-25201.1*****
	(-1.07)	(0.59)	(0.23)	(-3.30)
Time-FE	NO	YES	NO	YES
N	47	47	45	45
Within R^2	n/a	0.88	n/a	0.84
Sargan test	χ^2=18.68	n/a	χ^2=17.72	n/a

z-and t-statistics in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Wooldridge test for autocorrelation in panel data insignificant.

tain level, after which it would start to increase. Higher unemployment tends to reduce this ratio, suggesting that with higher unemployment, relatively more males than females would start opportunity-motivated ventures. In the case of necessity-motivated entrepreneurship, the ratio of female-to-male entrepreneurship seems driven by the size of the country (*pop*) and has an inverse U-shaped relationship. Human and physical capital also matter: coun-

tries with more of these have a higher ratio of female-to-male entrepreneurs motivated by necessity.

Table 9: Impact of military expenditure on the ratio of female to male opportunity and necessity-driven start-ups

	tea-opp-f-m:		tea-necc-f-m:	
	(1) S-DPD	(2) FE, robust	(3) S-DPD	(4) FE, robust
Lagged tea	-0.05	-0.04	-00.06	**-0.07****
	(-1.16)	(-0.42)	(-1.29)	(-2.47)
Military expenditure	**-0.22****	-0.14*	-0.60	4.88
	(-2.29)	(-1.76)	(-0.18)	(1.47)
gdppc	**-2.65***	**-6.76*****	6.04	**-94.77***
	(-2.16)	(-3.42)	(0.14)	(-1.91)
gdppc2	0.11	**0.34*****	-0.22	**5.91***
	(1.66)	(3.17)	(-0.11)	(2.19)
pop	**-1.42***	-5.25	-81.52	**-194.35***
	(-2.15)	(-1.50)	(-1.06)	(-1.78)
pop2	0.03	0.09	2.39	5.97
	(1.46)	(0.81)	(0.98)	(1.74)
trade	-0.02	-0.04	3.36	7.77
	(-0.22)	(-0.32)	(0.81)	(1.60)
credit	**0.21****	**0.21****	4.00	2.82
	(2.54)	(2.57)	(1.30)	(1.22)
capstock	**0.43***	**0.56****	2.86	-0.52
	(2.22)	(2.20)	(0.35)	(-0.06)
unemp	**-0.19*****	-0.04	0.72	3.09
	(-3.57)	(-0.77)	(0.36)	(1.56)
tfp	0.63	**0.61***	-1.17	-20.9
	(1.69)	(1.90)	(-0.08)	(-1.42)
hc	**0.99****	**1.11****	-18.04	-13.62
	(2.34)	(2.58)(-0.97)	(-0.83)	
startup costs	0.00	-0.01	-0.30	0.47
	(0.05)	(-0.38)	(-0.39)	(0.82)
constant	**23.7*****	**876.9****	600.34	**1894.1***
	(3.50)	(2.53)	(0.88)	(1.80)
Time-FE	NO	YES	NO	YES
N	456	456	443	443
Within R^2	n/a	0.26	n/a	0.10
Sargan test	χ^2=167.02	n/a	χ^2=114.14	n/a

z-and t-statistics in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Wooldridge test for autocorrelation in panel data insignificant.

Table 9 reports the impact of military expenditure as a measure of state-based conflict on the ratio of female-to-male startups. It shows that military expenditure is negatively and significantly associated with the ratio of female opportunity to male opportunity entrepreneurship.

It could be that military expenditure creates relatively more opportunities for male than female entrepreneurs. Unemployment has, as in the case of battle-related deaths, the same association. Higher levels of human capital are associated with higher ratios of female-to-male opportunity-motivated entrepreneurship. Higher GDP per capita is associated with a smaller female-to-male ratio in necessity-motivated entrepreneurship. These last two associations suggest that in more developed countries (as measured by human capital and GDP levels) the ratio of female-to male opportunity-motivated entrepreneurs and higher and the ration of female-to-male necessity-motivated entrepreneurs are lower.

4.3 Robustness checks

The key results of this study were presented in Tables 4 to 9. We used FE and system DPD models to obtain these results. The use of these different estimators, as well as the use of different measures of entrepreneurship and state-based conflict already provides robustness checks. We can see from these tables that there are several findings which are robust across estimators. We we can summarize these as follows:

- There is a negative relationship between state-based conflict measures and measures of productive entrepreneurship (opportunity-driven startups and employers in self-employment).

- Necessity-motivated start-up entrepreneurship is, on average, almost three times higher in countries in state-based conflict than in countries not in state-based conflict.

- Where significant, state-based conflict tends to push people into unproductive forms of entrepreneurship (necessity-driven startups and own account work).

- The nature of state-based conflict matters: when engaged in conflict that results in more than 25 battle-related deaths per year, the overall impact on entrepreneurship is worse than in the case of militarization per se.

- Development level matters for the impact of state-based conflict on entrepreneurship. In more developed countries with less unemployment, more trade and finance, and higher levels of human capital and GDP, entrepreneurship is more resilient, and the ratio of female-to-male entrepreneurs in opportunity-motivated entrepreneurship higher.

There is a reason for a further robustness check. This is because our dependent variable (s) are fractional response variables, ranging between 0 and 100. We want to avoid possible bias from this; hence we employed a fractional logistical estimator[16] as a robustness check. A further advantage of this estimator is that it can better capture non-linear effects, being based on the logistical distribution. Moreover, as Papke and Wooldridge (2008, p.122) explain, the factional logit model is most appropriate for "panel data with a large cross-sectional dimension and relatively few time periods," which is the case in our data, where we have 91 countries and only 18 time periods.

Tables 10 and 11 contain the results from using a fractional logistical estimator on start-up entrepreneurship and self-employment, respectively in the cases of battle-related deaths and military expenditure as measures of state-based conflict.

From Table 10 can be seen that state-based conflict, measured by battle-related deaths, has a negative, but insignificant, association with start-up entrepreneurship and self-employment rates (employers and own account workers). With higher unemployment, more people will be pushed into self-employment during state-based conflict. This effect is stronger in more populous countries and will be facilitated by financial development. In poorer countries however, fewer of the self-employed will be employers, and opposed to own account workers. It can also be seen that start-up and self-employment rates are persistent over the short-term in the face of state-based conflict.

Table 11 shows that state-based conflict, measured by military expenditure, is associated with higher rates of unproductive startups (necessity-motivated) and reduces all forms of self-employment. The finding that military expenditure is positively associated with necessity-motivated entrepreneurship is consistent with that of Table 6, where the association was also positive, however not significant.

The negative association with own account workers is consistent with the findings in Table 7; however, in Table 7 we had military expenditure exerting a positive impact on employers in self-employment. Once we that the factional nature of the dependent variable into consideration, this impact becomes negative. Again, all forms of entrepreneurship show persistence over the short-term.

The results in Tables 10 and 11 are consistent with those in Tales 4 to 9. It shows that economic and financial development, lower unemployment, and human capital can help make entrepreneurs more resilient in the face of state-based conflict.

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[16]Implemented with the *fracreg logit* command in STATA.

Table 10: Regression Results using a Fractional Logit Estimator in the Case of Battle-Related Deaths

	Startup rates :		Self-employment:	
	(1) tea-opp	(2) tea-necc	(3) employers-r	(4) own-acc-r
Lagged tea	**7.60*****	**7.91*****	**15.73*****	**5.25*****
	(3.04)	(2.66)	(14.95)	(21.92)
Battle-related deaths	-0.06	-0.05	-0.01	0.00
	(-0.74)	(-0.63)	(0.70)	(0.71)
gdppc	0.72	-2.07	**-0.92***	0.46
	(0.16)	(0.58)	(-1.84)	(1.00)
gdppc2	-0.05	0.10	0.05	-0.03
	(-0.21)	(0.49)	(1.72)	(-1.09)
pop	1.15	4.02	**1.05*****	**1.74*****
	(0.32)	(1.30)	(3.12)	(4.996)
pop2	-0.03	-0.11	**-0.04*****	**-0.05*****
	(-0.37)	(-1.37)	(-4.21)	(-5.03)
trade	-0.52	**-0.96***	-0.11	0.13
	(0.87)	(-1.81)	(-1.49)	(1.20)
credit	0.46	**0.72***	**0.14***	**0.14***
	(1.21)	(1.96)	(2.62)	(2.16)
capstock	-003	-0.22	0.13	-0.02
	(-0.07)	(-0.55)	(1.54)	(-0.28)
unemp	-0.01	-0.15	**0.09****	**0.15****
	(-0.39)	(-1.08)	(2.79)	(3.35)
tfp	2.05	-1.71	**0.54*****	0.05
	(0.79)	(-0.68)	(3.52)	(0.30)
hc	0.78	-0.46	0.00	0.06
	(1.18)	(-0.94)	(-0.05)	(0.35)
startup costs	**0.29***	0.06	**0.12*****	0.07
	(2.42)	(0.51)	(4.25)	(2.50)
constant	-15.45	-25.35	**-9.05*****	**-21.8*****
	(-0.84)	(-1.71)	(-2.97)	(-7.43)
Time-FE	YES	YES	YES	YES
N	47	47	108	108
Pseudo R^2	0.04	0.03	0.02	0.14

z-values in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

5 Concluding Remarks

By 2020, 56 active state-based conflicts were raging in the world, the most since World War II. Since the end of the Cold War, these conflicts have claimed more than 1,5 million direct casualties. The channels of the economic, political, and humanitarian impacts of such state-based conflicts have been extensively studied. A relatively neglected, but potentially

Table 11: Regression Results using a Fractional Logit Estimator in the Case of Military Expenditure

	Startup rates:		Self-employment:	
	(1) tea-opp	(2) tea-necc	(3) employers-r	(4) own-acc-r
Lagged tea	**7.23***	**15.41***	**16.13***	**5.56***
	(13.05)	(14.14)	(28.74)	(61.79)
Military expenditure	0.03	**0.08***	**-0.04***	**-0.07***
	(0.88)	(1.91)	(-3.95)	(-6.57)
gdppc	**1.05**	**2.47***	**0.86***	**0.97***
	(2.96)	(4.85)	(6.64)	(8.20)
gdppc2	**-0.05**	**-0.14***	**-0.04***	**-0.05***
	(-2.99)	(-5.26)	(-6.88)	(-9.31)
pop	-0.13	-0.16	**0.34***	**0.35***
	(-0.71)	(-0.82)	(3.53)	(4.99)
pop2	**0.01***	**0.01***	**-0.01***	**-0.01***
	(1.83)	(1.96)	(-4.07)	(-5.65)
trade	-0.07	-0.04	-0.00	**-0.06***
	(-1.55)	(-0.68)	(-0.24)	(-3.28)
credit	0.00	-0.02	**0.06***	**0.07***
	(0.10)	(-0.34)	(4.01)	(5.73)
capstock	**-0.25***	**-0.27***	0.03	0.00
	(-3.56)	(-3.49)	(1.57)	(0.10)
unemp	**-0.17***	-0.04	**0.02***	**0.09***
	(-4.67)	(-1.05)	(1.74)	(6.47)
tfp	-0.47	**-1.32***	**-0.59***	**-0.18***
	(-1.44)	(-3.17)	(-4.57)	(-2.47)
hc	-0.23	-0.14	-0.04	**0.12***
	(-1.30)	(-0.88)	(-0.89)	(3.09)
startup costs	**-0.03***	-0.01	**0.02***	**0.01***
	(-2.30)	(-0.41)	(3.47)	(2.75)
constant	-4.42	**-11.51***	**-11.31***	**-10.16***
	(-1.39)	(-4.06)	(-11.49)	(-10.64)
Time-FE	YES	YES	YES	YES
N	456	456	908	908
Pseudo R^2	0.04	0.06	0.02	0.18

z-statistics in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

important channel, is entrepreneurship.

In this light, the purpose of this paper was to study the relationship between state-based conflict and entrepreneurship. From a survey of the literature we formulated two hypotheses: (1) state-based conflict has a negative association with productive and opportunity-motivated forms of entrepreneurship, and (2) state-based conflict has a positive association with unproductive and necessity-motivated forms of entrepreneurship.

To test these hypotheses, we used several measures of state-based conflict and entrepreneurship and employed a range of estimators to gather robust empirical evidence. State-based conflict was measured by battle-related deaths and military expenditure (as a share of GDP). Entrepreneurship was measured using dynamic start-up measures such as early-stage rates and static business ownership/ self-employment rates, as well as by motivation, for instance, whether someone is an entrepreneur out of necessity or to pursue an opportunity. Data was sourced from UCDP/PRIO, the Global Entrepreneurship Monitor (GEM), World Bank Development Indicators, and the International Labour Organization (ILO). Eighteen years (2001-2018) and 91 countries were covered. In total 19 of these countries experienced state-based conflict causing more than 134,000 direct battle-related deaths.

We presented three sets of descriptive statistics to provide an initial battery of evidence on the relationship between state-based conflict and entrepreneurship. It found that the average country in our sample had a relatively high GDP per capita per year of US$19,442, had about 63 million inhabitants, an unemployment rate of 8,14% and start-up costs that on average amounted to 21% of GNI per capita. Opportunity-motivated entrepreneurship was found to be negatively associated with battle-related deaths, and necessity-motivated entrepreneurship was found to be positively correlated with battle-related deaths.

Necessity-motivated start-up entrepreneurship is on average higher in countries in conflict than in countries not in conflict - 4,75% vs 2,46% - in other words, on average necessity motivated entrepreneurship rates are 193% (about three times) higher in countries in state-based conflict. The descriptive statistics furthermore showed that countries suffering from state-based conflict had more survivalist / non-productive forms of entrepreneurship, were more militarized, and were substantially poorer. These descriptive statistics are consistent with our hypotheses.

To provide a second battery of evidence, we used various regression estimators - including fractional logit, fixed-effect, and system dynamic panel data estimators - to robustly study the association between our variables of interest. Thus, we considered the fractal nature of our dependent variables, endogeneity, and moreover exploited the (unbalanced) panel nature of our data.

Based on our regression results we could not reject our hypotheses. Specifically, w found that:

- There is a negative relationship between state-based conflict measures and measures

of productive entrepreneurship (opportunity-driven startups and employers in self-employment).

- State-based conflict tends to push people into unproductive forms of entrepreneurship (necessity-driven startups and own account work).

- The nature of state-based conflict matters: when engaged in a conflict that resulted in more than 25 battle-related deaths per year, the overall impact on entrepreneurship was worse than in the case of militarization.

- Development level matters for the impact of state-based conflict on entrepreneurship. In countries with less unemployment, more finance, and higher levels of physical and human capital and GDP, entrepreneurship is more resilient, and the ratio of female-to-male entrepreneurs in opportunity-motivated entrepreneurship higher.

Our results confirm that state-based conflict reduces job-creating and opportunity-driven entrepreneurship and drives people into necessity-driven, non-productive, entrepreneurship. These outcomes are consistent with new institutional economics approach (Minniti, 2008; North et al., 2009), the work of Baumol (1990), and previous research on national rates of entrepreneurial effort type (Amorós et al., 2017). It also confirms that the impacts of state-based conflict described on the firm-level, as reported in a special journal issue on the topic in 2013 edited by Brück et al. (2013), are reflected on the country level.

Ending state-based conflicts is a moral, humanitarian, environmental, economic and entrepreneurial imperative. As long as this cannot be achieved, supporting entrepreneurs to be resilient, and to rebound after conflict, is needed. The results presented in this paper suggest that economic and financial development, lower unemployment, and improved human and physical capital are associated with entrepreneurial resilience in the face of state-based conflict.

Appendices

Appendix A: Summary statistics

Table 12: Summary of variables

Variable	Observations	Mean	St. Dev.
Entrepreneurship			
tea	840	11.23	7.56
tea-necc	840	2.91	2.75
tea-opp	840	7.93	5.18
self-emp-r	1,614	31.01	21.72
employers-r	1,620	4.04	2.03
State-based conflict			
battledeaths	221	610	880
milexp	1,537	1.88	1.44
armedforces	1,570	1.31	1.24
Controls:			
gdppc	1,602	19,442	20,666
pop	1,620	63,113,450	190,629,389
trade	1,598	90.53	60.95
credit	1,548	65.58	45.86
capstock	1,513	3,104,328	6,855,428
unemp	1,620	8.14	5.84
startcost	1,301	20.92	58.45
hc	1,461	2.77	0.58
tfp	1,326	1.00	0.08

Authors' calculations.

Appendix B: Countries in the sample

Table 13: Countries in the sample that experienced state-based violence 2001-2018 (Total battle-related deaths in brackets)

No Conflict	Post-Conflict	In Conflict
Argentina, Australia	Peru (150)	Burkina Faso (79)
Austria, Barbados, Belgium	Indonesia (2,785)	Uganda (7,009)
Bosnia and Herzegovina	Angola (1,799)	Turkey (9,596)
Bolivia, Botswana, Brazil		Thailand (1,864)
Bulgaria, Canada, Chile		Russia (7,952)
China, Costa Rica, Croatia		Philippines (10,574)
Cyprus, Czech Republic		Pakistan (29,832)
Denmark, Dominican Republic		Nigeria (18,368)
Ecuador, El Salvador		Israel (4,996)
Estonia, Finland, France		Iran (1,100)
Germany, Ghana, Greece		India (17,617)
Guatemala, Hong Kong		Egypt (2,483)
Hungary, Iceland, Italy		Colombia (10,561)
Jamaica, Japan, Jordan		Cameroon (2,065)
Kazakhstan, Latvia		Algeria (5,404)
Lithuania, Luxembourg		Lebanon (272)
Malaysia, Mexico		
Morocco, Netherlands		
New Zealand, North Macedonia		
Norway, Panama, Poland		
Portugal, Puerto Rico, Qatar		
Romania, Saudi Arabia		
Singapore, Slovakia		
Slovenia, South Korea		
Spain, Sweden, South Africa		
Switzerland, Trinidad and Tobago		
Tunisia, United Arab Emirates		
United Kingdom, Uruguay		
Venezuela, Vietnam, Zambia		

Source: Authors' compilation from UCDP/PRIO

Appendix C

Figure 6: Graphical presentation of conflict and productive entrepreneurship in selected countries in conflict, 2001-2018
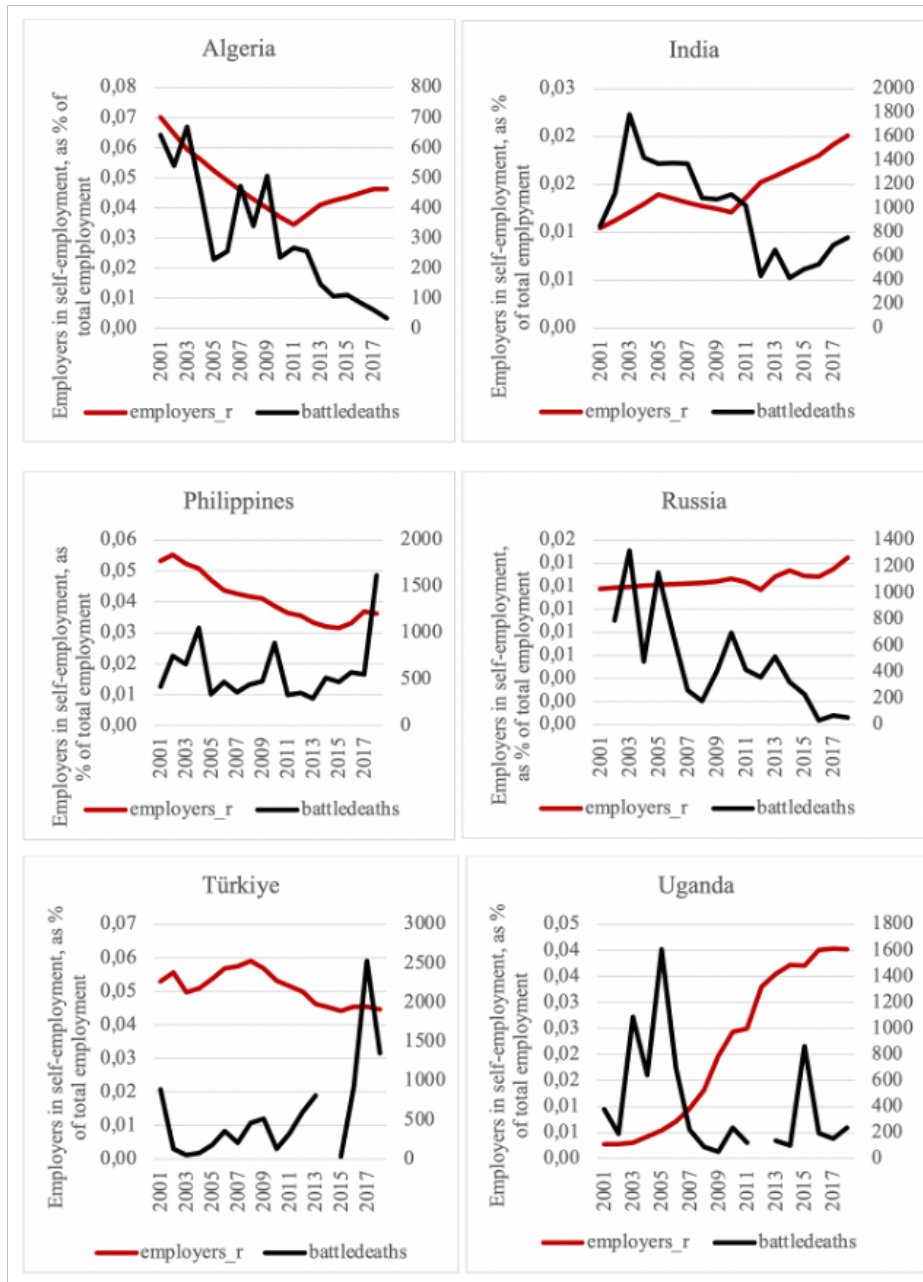
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